



# STRESSSESSESSES

IT'S NOT JUST FOR  
YOU AND ME

STEPHEN AUSMUS (K10003-7)

Vitamin C and beta-glucan supplements can help piglets gain weight after weaning.



Whenever we feel stress—like falling off a ladder—our bodies react in predictable ways—increased heart rate, rapid and shallow breathing, and an adrenaline rush. Animals feel stress too, and it can compromise their health and ability to thrive. That, in turn, can cost producers money.

Researchers in the Livestock Behavior Research Unit in West Lafayette, Indiana, study stress in poultry, swine, and cattle.

In one study, research leader Donald C. Lay, Jr., used animal restraint and stress-inducing hormone injections of sows as stressors. He found that prenatal stress, the stress imposed on a pregnant animal, resulted in widespread effects on the offspring.

“Prenatal stress has been shown to have effects on the behavior and physiology of many species, including monkeys, rats, guinea pigs, goats, humans, and swine,” says Lay. “Research in our lab has shown that prenatal stress, from restraint and stress hormone injection of sows, caused offspring to have increased plasma cortisol levels in response to stress and less ability to heal a wound when subjected to stress.”

Cortisol is a glucocorticoid—a class of steroid hormones that suppress the immune system. Cortisol can also raise blood pressure and blood sugar levels.

“Prenatal stress has been shown to cause an increase in fetal cortisol, which may in turn impair immune function and increase the maximum binding capacity of glucocorticoid receptors in the central nervous system immediately after birth.”

Pigs in social groups are known to form hierarchies. Sows at the bottom of the hierarchy may produce litters of prenatally stressed piglets. Lay and his colleagues have shown that the effects associated with prenatal stress in swine, however, are not caused by cortisol alone. They are continuing research to identify the other factors involved.

### Treating Farm Animal Stress from the Inside Out

Animal well-being can be improved and stress counteracted in farm animals by enhancing their enteric health and immunity through dietary supplements. In studies to reduce the negative health effects of a known stressor—such as animal transport and handling—animal physiologist Susan Eicher has shown that beta-glucan (a yeast cell-wall product) and vitamin C supplements, fed together, can improve piglet health by enhancing the animals’ growth and immune function after transport.

In Eicher’s studies, piglets received diets supplemented with beta-glucan alone, vitamin C alone, or both beta-glucan and vitamin C. An unsupplemented diet was fed to piglets as a control.

“Piglets receiving both vitamin C and beta-glucan had a greater weight gain after weaning,” says Eicher. “We also detected changes in the expression of immune-system communication molecules called ‘cytokines’ in intestinal and liver tissues.” Other animal species may also benefit from this combination diet during stressful times, such as transport.

This ARS nutritional supplemental combination was patented in 2005 and is licensed. The marketed product is presently used by calf producers in Idaho, and they report a lower incidence of respiratory problems.

### Reducing Stress—and Pain—of Birds’ Beak Trimming

Beak trimming is a routine husbandry procedure used in the commercial poultry industry—particularly in broiler breeders and laying hens—to reduce injuries during confinement.

During conventional beak trimming, one-third to one-half of the beak is removed. A hot blade is normally used to cut and cauterize the beaks of chicks. But the process can be painful to the birds, so alternative methods are needed.

Biologist Heng Wei Cheng has identified a better technique—infrared laser—that can reduce pain and tissue damage.

“Infrared lasers have been widely used for noninvasive surgical procedures in human medicine and their results are reliable, predictable, and reproducible,” says Cheng. “Infrared lasers have recently been designed with the purpose of providing a less painful, more precise beak-trimming method compared with conventional beak trimming.”

Infrared laser was compared to conventional beak trimming, and the results are promising. “Our results indicate that while there was no statistical difference in egg production or bird body weight between the two beak-trim treatments, those birds treated with the infrared method displayed superior feather condition and reduced aggression, even though they had less of the beak removed,” says Cheng. “The data show that infrared beak treatment may reduce the damage done by feather pecking and provides a better alternative to conventional beak trimming. Indeed, infrared trimming may provide a less invasive alternative to conventional beak trimming without compromising productivity.”

These research efforts are just some of many projects of the Livestock Behavior Research Unit that are aimed at improving existing practices and inventing new practices that enhance animal well-being and increase animal productivity.—By **Sharon Durham, ARS.**

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